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INTRODUCTION

According to Bailey (1898) the raspberry has been cultivated in Europe since the fourth century. Varieties of European origin are mentioned in American literature as early as 1806. Bailey states that the native American raspberry was first brought into cultivation about 1825. This was a purple variety. Cultivation of the black raspberry began about 1832 and the American red raspberry was first cultivated about 1860.

Nearly all raspberries cultivated for their fruit in North America are derived from the American and European red raspberries and from the American black raspberry *Rubus occidentalis* Linn. There is much difference of opinion among botanists whether or not the American red raspberry *Rubus strigosus* Michx. should be considered a subspecies of the European red raspberry *Rubus idaeus* Linn. In this bulletin they are treated as distinct species in accordance with Rosendahl and Butters (1927) and others. Hedrick (1925) considers *R. strigosus* a subspecies. All black varieties are derived from *R. occidentalis* and the purple raspberries are hybrids of red and black varieties. Several oriental species are grown to a limited extent. The Japanese wineberry *Rubus phoenicolasius* Maxim. and the strawberry-raspberry *Rubus illecebrosus* Focke, are the best known of the oriental species.

CHARACTERS USED TO IDENTIFY RASPBERRY SPECIES

Red raspberries are usually distinguished from black raspberries by the color of the fruit and by the erect canes that are more or less covered with straight, stiff, bristle-like prickles. When referring to red raspberries these are called bristles in this bulletin to distinguish them from the typical prickle of the black raspberry, altho botanically both are prickles. The canes of the black raspberry are erect and arching with few to many prickles that are usually more or less hooked. A few cultivated varieties are almost without prickles. Varieties which produce amber-white fruit occur in both the red and the black raspberry.

The European raspberry *R. idaeus* is distinguished from *R. strigosus* by heavier and more rugose foliage and by the absence of stalked glands. The canes of *R. strigosus* are more slender and usually darker in color. The following comparison is taken from descriptions by Hedrick (1925) and by Rosendahl and Butters (1927).

The young canes of *R. idaeus* are often finely tomentose, becoming glabrate and are not bristly to the top. The inflorescence is more or less bristly but without glands; the peduncles and pedicels are finely pubescent. Stalked glands are not found on the canes. The hypanthium is broad and easily seen in the open flower; the stamens are erect. The sepals are tomentose and often bear a few hooked prickles. The style is not so slender as the style of *R. strigosus*. The fruit is dark red or yellow, thimble-shaped, and is produced more or less continuously throughout the season.

The young canes of *R. strigosus* are typically without pubescence and are bristly to the top. The inflorescence is glandular, and more or less bristly; the peduncles and pedicels are not pubescent. Stalked glands are common on the canes. The hypanthium is narrow and concealed by the stamens which are incurved. The sepals are glandular and bristly; the style is very slender. The leaves are less tomentose beneath than the leaves of *R. idaeus*. The fruit is bright red or rarely yellow, and hemispherical.

Rosendahl and Butters (1927) call attention to a subspecies *R. strigosus* var. *canadensis* which occurs in northern Minnesota and is found from Labrador to Alaska. The pubescence of this subspecies is typical of *R. idaeus* and occasional specimens occur with few or no glandular bristles. The floral characters, however, resemble *R. strigosus* rather than *R. idaeus*. It is noteworthy that Grubb (1922) reports that both glabrous and pubescent forms of the wild red raspberry occur in England.

DERIVATION OF OUR CULTIVATED RASPBERRIES

Examination of the following cultivated varieties indicate that the majority have been derived from hybrids of *R. idaeus* and *R. strigosus*. Darrow (1920) working with a somewhat different list of varieties concluded that most of the cultivated red raspberries grown in North America at the present time are derived either directly from *R. strigosus* or are hybrids between that species and *R. idaeus*. The fact that a variety is typically of the *R. strigosus* type does not preclude the possibility of its being derived partly from *R. idaeus*. Of the intermediate group the Cuthbert, Golden Queen, and Herbert show most evidence of the *R. idaeus* type.

R. strigosus	*R. strigosus* x *R. idaeus*		*R. idaeus*
Chief	Cuthbert	Latham	La France
King	Eaton	Loudon	Lloyd George
Ohta	Golden Queen	Marlboro	
Ranere (St. Regis)	Herbert	Newman	
Sunbeam	June	Viking	

IDENTIFICATION OF HORTICULTURAL VARIETIES

Those who are familiar with raspberry-growing do not find it difficult to recognize varieties in the field during the growing season. It is much more difficult to assemble and classify the characters on which the recognition is based. Some characters are extremely variable and are influenced by location, soil, climate, and plant diseases.

In a previous paper on the identification of raspberry varieties, the writer (1925) describes certain characters which were found to be relatively constant under varying conditions of growth. Attention was called to the abundance, color, and structure of the bristles; the number and form of the leaflets; the color of the foliage; the presence or absence of glaucous bloom.

Owing to the frequent occurrence of hybrids between *R. strigosus* and *R. idaeus* many of the botanical characters which separate these species can be used to identify horticultural varieties. It is important to observe that the young canes differ in some characters from the fruiting canes of the same variety, as for example in the number of leaflets. For this reason the young canes have been used for identification except when portions of the flowering stalk are referred to. The fruit has not been used as a primary factor in descriptions so that varieties may be identified at any time during the growing season. The differences between black raspberry varieties are less marked, probably because all the black varieties are derived from one species.

The shape of the foliage is relatively constant and may be used to separate varieties of the red raspberry. The leaflets of some

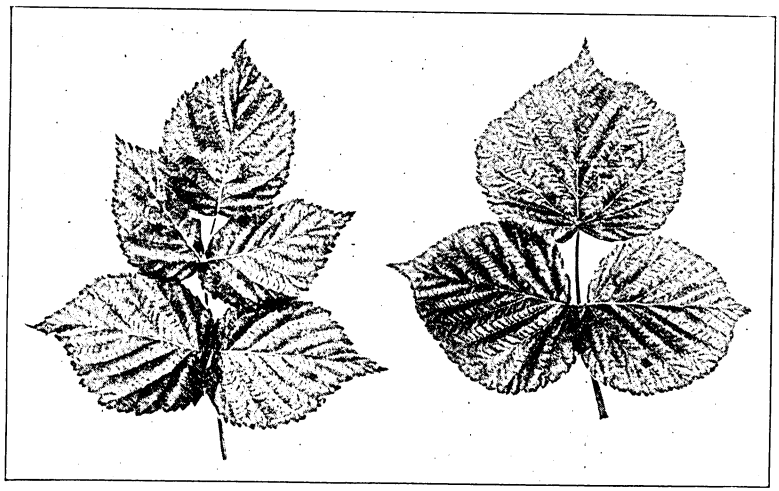

Fig. 1. Two Varieties of Red Raspberry Leaves
Right, Sunbeam, with broad terminal leaflets; left, Latham, with narrower leaflets.

varieties are broad, with the width of the terminal leaflet often equal to the length, or nearly so. The leaflets of other varieties are narrower, the width of the terminal leaflet being decidedly less than the length. Typical leaves are illustrated in Figure 1.

Stalked glands as illustrated in Figure 2 are characteristic of *R. strigosus* but not of *R. idaeus*. They can be seen readily with a hand lens. In some varieties they are present on the cane, petiole, peduncle, pedicel, calyx, and other parts; in others only on some of these parts. Bristles on the young canes of most cultivated varieties generally are not glandular; however, those on the native *R. strigosus* usually are.

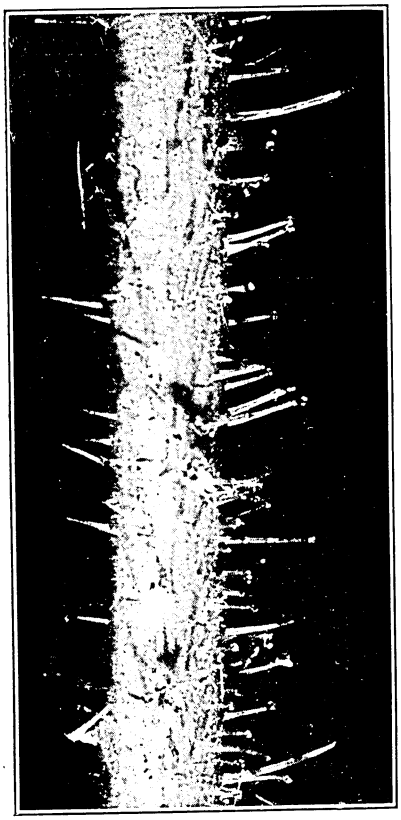

Fig. 2. Stalked Glands, Much Enlarged, on Petiole of Sunbeam Raspberry

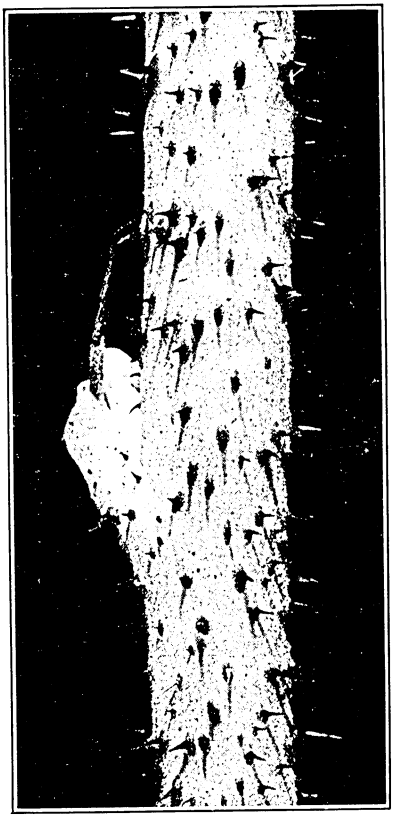

Fig 3. Young Cane Showing the Dark Base of the Bristles, Variety Lloyd George

In a few instances the only glands present are sessile or practically so, for example those on the petiole of Latham. They are found mostly at the junction of the lower pair of leaflets but are so small that they may easily pass unnoticed. They are much less conspicuous than the typical stalked glands of *R. strigosus*.

Stalked glands are not found on black or purple varieties, but extremely small sessile glands are common on the cane, petiole, pedicel, and calyx. It is noteworthy that typical stalked glands are common on the cane, petiole, pedicel; and calyx of the blackberry.

The general character and abundance of bristles on the cane, petiole, peduncle, pedicel, and calyx can be used in identification. Bristles on the lower portion of the cane are of little or no value for this purpose. Most varieties have many bristles within 6 to 12 inches of the ground and these are usually more slender and lack the individual character of those on the upper portion of the cane. This also is true of the bristles on very young canes.

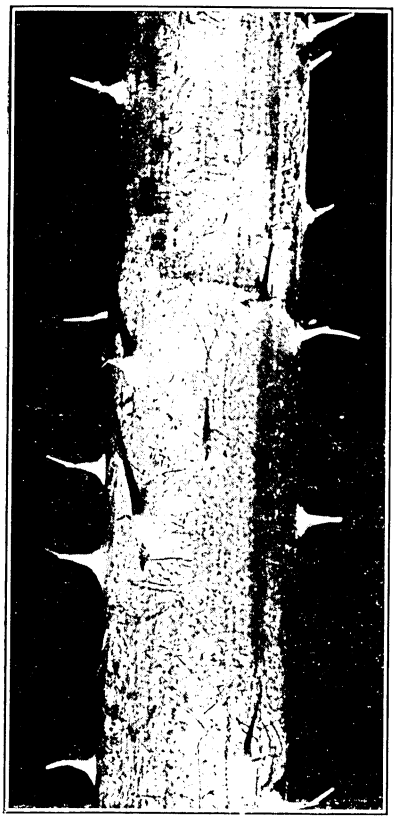

Fig. 4. Golden Queen, Showing Enlargement at the Base of the Bristles on the Young Cane

An abundance of bristles is typical of *R. strigosus* altho many cultivated varieties have few. Varieties may be divided into two groups, (1) those with many bristles on the petiole and (2) those without or with few (usually not exceeding 20 to 25).

The color of the bristle at its base is also characteristic and can be used in identification. Here again varieties may be divided into two groups, (1) those with bristles conspicuously darker at the base than the young cane as illustrated in Figure 3 and (2) those with bristles similar in color at the base.

The structure of the bristle or prickle is useful in identification. In some varieties the base of the bristle is markedly enlarged as illustrated in Figure 4 in contrast to the lack of any obvious enlargement in other varieties. The average length of the bristles or prickles is also helpful in identification.

Bristles are generally present on the calyx of red varieties and vary in number from few to many. The lack of bristles or prickles on the calyx of all black varieties examined indicates a characteristic difference in this respect between red and black varieties. The only purple raspberry observed, the Columbian, was found to have very few prickles on the calyx.

The color of the new growth at the tip of the cane is not a reliable character except to distinguish yellow fruited varieties. These do not show any indication of red at the tip. The amount of color shown at the tip of red varieties changes considerably according to location and season.

The number of leaflets comprising a single leaf is not sufficiently constant to use in identification and varies on the old and new canes of the same variety. Leaves of the young canes have either three or five leaflets; those of the flowering shoot invariably have only three.

Grubb (1922) mentions the appearance of pubescence at the tip of the new canes as the most constant character under all conditions of growth in England. This is not true of varieties most commonly grown in North America.

KEY TO 16 VARIETIES OF RASPBERRIES

The following key is based, in so far as possible, on cane and foliage characters. For purposes of identification young canes not less than half grown are used, as very young canes do not exhibit distinct varietal characters.

A. Canes erect, with few to many straight, stiff bristles; fruit red or yellow.

B. Terminal leaflets on the young cane broad, width often equal to length or nearly so.

C. Petiole of leaves near the tip of the young cane with bristles absent or few, usually not exceeding 20 to 25 bristles.

D. Petiole of leaves on the young cane with many sessile glands, mostly at the junction of the lower leaflets and the petiole.

Canes medium height; moderately glaucous; bristles on the young cane very few; base of bristles about the same color as the young cane; bristles on the petioles near the tip of the young cane few, not gland-tipped, 0.5-1.0 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit red, conic, medium to large, firm, midseason; drupelets medium to large.....**LOUDON**

DD. Petiole of leaves on the young cane with sessile or stalked glands absent or very occasional.

Canes tall, very glaucous; leaves dark green, distinctly rugose; bristles on the young cane usually absent; bristles on the petioles near the tip of the young cane absent or very occasional, not gland-tipped, 0.5-1.0 mm. in length; petiole

and pedicel glabrous; pedicel and calyx with very few bristles, not gland-tipped; calyx finely tomentose; fruit red, round, very large, firm, early; drupelets large.....**JUNE**

CC. Petiole of leaves near the tip of the young cane with many bristles.

D. Bristles on the young cane with base usually much enlarged.

Canes tall, moderately to very glaucous; leaves dark green, distinctly rugose; bristles on the young cane extremely numerous; base of bristles about the same color as the young cane, distinctly enlarged; bristles on the petioles near the tip of the young cane numerous, mostly gland-tipped, 1.0-3.0 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit dark red, round, medium size, soft, decidedly acid, midseason; drupelets medium size.....**SUNBEAM**

DD. Base of bristles on the young cane not conspicuously enlarged.

Canes medium tall, slightly glaucous, leaves medium green, not conspicuously rugose; bristles on the young cane numerous; base of bristles about the same color as the young cane; bristles on the petioles near the tip of the young canes common, mostly gland-tipped, 1.0-2.0 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles mostly gland-tipped; calyx finely tomentose; fruit red, round-conic, large, unusually firm, early; drupelets medium to small.....**CHIEF**
(syn. *Minn. No. 223*)

BB. Width of terminal leaflets on the young cane decidedly less than the length.

C. Petiole of leaves near the tip of the young cane with bristles absent or few, usually not exceeding 20 to 25 bristles.

D. Bristles on the young cane absent or occasional.

Canes medium height, not obviously glaucous; bristles on the petioles near the tip of the young cane absent or occasional, not gland-tipped, 0.5-1.0 mm. in length; petiole of leaves on the young cane with many sessile glands, mostly at the junction of the lower leaflets and the petiole; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit dark red,

round-conic, very large, firm, rather acid, midseason, does not separate easily from receptacle; drupelets large.....**EATON**
(syn. *Alton Improved, Crimson Beauty, Idaho, Iowa, Paragon*)

DD. Bristles on the young cane common to numerous.

E. Petiole of leaves on the young cane with many sessile glands, mostly at the junction of the lower leaflets and the petiole.

Canes tall, moderately to very glaucous; bristles on the young cane common; base of bristles about the same color as young cane; bristles on the petiole near the tip of the young cane few, not gland-tipped, 1.0-1.5 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit red, round, very large, firm, late midseason; drupelets medium size.....**LATHAM**
(syn. *Imogene, Minnesota No. 4, Redpath*)

EE. Petiole of leaves on the young cane with sessile or stalked glands absent or very occasional.

Canes tall, moderately glaucous; bristles on the young cane common; base of bristles about the same color as young cane; bristles on the petioles near the tip of the young cane very few, not gland-tipped, 0.5-1.0 mm. in length; petiole glabrous, pedicel finely pubescent; pedicel and calyx with many bristles, not gland-tipped, but with occasional sessile glands; calyx finely tomentose; fruit red, round-conic, large, firm, midseason; drupelets medium size.....**VIKING**

CC. Petiole of leaves near the tip of the young cane with many bristles.

D. Base of bristles conspicuously darker in color than the young cane.

Canes medium tall, moderately glaucous; terminal leaflets often 3-lobed; bristles on the young cane numerous; base of bristles red; bristles on the petioles near the tip of the young cane numerous, mostly gland-tipped, 1.0-3.0 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit red, round, medium size, rather soft, very early; drupelets medium size..**RANERE**
(syn. *St. Regis*)

DD. Base of bristles about the same color as the young cane.

E. Bristles on the petioles of the young cane mostly gland-tipped.

F. Bristles on the young cane common but not extremely abundant.

Canes tall, moderately glaucous, bristles on the young cane common; bristles on the petiole near the tip of the young cane common, frequently gland-tipped 1.0-1.5 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit red, round, large, firm, early; drupelets medium size.....**KING**

FF. Bristles on the young cane very numerous.

Canes tall, moderately to very glaucous; bristles on the young cane very numerous; bristles on the petioles near the tip of the young cane very numerous, mostly gland-tipped, 1.0-2.0 mm. in length; petiole and pedicel glabrous; pedicel and calyx with many bristles, mostly gland-tipped; calyx finely tomentose; fruit red, round, medium size, soft, rather acid, midseason; drupelets medium to small.....**OTHA**
(syn. *Flaming Giant*)

EE. Bristles on the petioles of the young cane not gland-tipped or rarely so.

F. Tip of new growth yellowish green.

Canes tall, moderately glaucous; terminal leaflets narrow; bristles on the young cane common, distinctly rigid and prickle-like; base of bristles about the same color as young cane; bristles on the petiole near the tip of the young cane, common, usually from 20 to 30 in number, not gland-tipped, or rarely so, 1.5-2.0 mm. in length; petiole glabrous; pedicel slightly pubescent; pedicel and calyx with few bristles, not gland-tipped; petiole of leaves on the young cane with occasional sessile glands, mostly at the junction of the lower leaflets and the petiole; similar sessile glands common on the pedicel and occasional on the calyx; calyx finely tomentose; fruit yellow, conic, medium to large, rather soft, midseason; drupelets small.....**GOLDEN QUEEN**

FF. Tip of new growth tinted with red.

G. Petiole of leaves on the young cane with many sessile glands, mostly at the junction of the lower leaflets and the petiole.

Canes tall, moderately glaucous; terminal leaflets narrow; bristles on the young cane common, distinctly rigid and prickle-like; base of bristle about the same color as young cane; bristles on the petiole near the tip of the young cane common, usually from 20 to 30 in number, not gland-tipped, 1.5-2.0 mm. in length; petiole glabrous; pedicel finely pubescent; pedicel and calyx with few bristles, not gland-tipped; sessile glands common on pedicel and occasional on calyx; calyx finely tomentose; fruit dark red, conic, large, firm, midseason; drupelets small ..... **CUTHBERT**

GG. Petiole of leaves on the young cane with sessile or stalked glands absent or very occasional.

Canes tall, moderately glaucous; terminal leaflets moderately broad; bristles on the young cane numerous, quite rigid and prickle-like; base of bristles about the same color as the young cane; bristles on the petioles near the tip of the young cane common, usually from 20 to 30 in number, not gland-tipped, 1.0-1.5 mm. in length; petiole glabrous, exceptionally short; pedicel finely pubescent; pedicel and calyx with many bristles, not gland-tipped; calyx finely tomentose; fruit red, round-conic, large, rather soft, midseason; drupelets medium size ..... **HERBERT**

AA. Canes recurving or spreading, with few to many prickles which are usually more or less hooked; fruit black or dull purple-red.

B. Prickles present on calyx.

Canes very tall, upright-spreading, moderately glaucous, with many very small sessile glands; leaves at tip of cane slightly tinted with red; straight or slightly hooked prickles common on the young cane, not gland-tipped; prickles on the petioles near the tip of the young cane few, usually 10 to 15 in number, not gland-tipped, 1.5-2.0 mm. in length; petiole glabrous; pedicel and calyx finely tomentose with occasional sessile glands; prickles common on the pedicel and occasional on the calyx; fruit broadly-round, midseason, large, firm, dull purple-red; drupelets large..... **COLUMBIAN**

BB. Prickles not present on calyx.

C. Leaves at tip of cane tinted with red.

Canes very spreading, almost trailing, very glaucous, with many very small sessile glands; hooked prickles common on the young cane, not gland-tipped; prickles on the petiole near the tip of the young cane common, usually 10 to 15 in number, not gland-tipped, 2.0-3.0 mm. in length; petiole glabrous; pedicel and calyx finely tomentose, with occasional sessile glands, prickles common on the pedicel and absent on the calyx; fruit round, midseason, medium to large, firm, glossy black, without bloom; drupelets rather small.....**OLDER**

CC. Leaves at tip of cane not tinted with red.

Canes tall, recurving, very glaucous, with many very small sessile glands; straight or slightly hooked prickles common on the young cane, not gland-tipped; prickles on the petioles near the tip of the young cane few, usually 5 to 10 in number, not gland-tipped, 1.0-2.0 mm. in length; petiole glabrous; pedicel and calyx finely tomentose with occasional sessile glands; prickles common on the pedicel and absent on the calyx; fruit conical, early midseason, large, firm, jet black, heavily glaucous; drupelets large .....**CUMBERLAND**

SUMMARY

Nearly all red raspberries cultivated for their fruit in North America have been developed from the American red raspberry *R. strigosus* Michx. and from hybrids between this species and the European red raspberry *R. idaeus* Linn. Many of the botanical characters which separate these two species can be used in the identification of horticultural varieties.

The most useful characters for varietal identification are found to be the presence or absence of glands on the petiole, peduncle, pedicel, and calyx, and whether these glands are stalked or sessile; the form of the leaflets on the young canes, especially the width of the terminal leaflet in relation to its length; the character and abundance of bristles or prickles on the young cane, petiole, peduncle, pedicel, and calyx, especially their abundance on the petiole and the color at their base; the character of the fruit.

A key to 16 varieties of red, black, and purple raspberries is included. This key is based, in so far as possible, on cane and foliage characters so that identification can be made at any time during the growing season.

GLOSSARY

Bristle	Botanically the same as a prickle. Used to designate the typical straight, stiff, bristle-like prickle of the red raspberry
Calyx	The outer floral envelope, consisting of sepals
Drupelet	A small fleshy fruit with a pit or stone. The fruit of a raspberry is composed of an aggregation of drupelets
Epidermis	The outer layer, the skin of plants
Glabrate	Becoming nearly or quite smooth by the loss of pubescence
Glabrous	Smooth, i.e., without hairs or any form of pubescence
Gland	A surface or structure that produces nectar, resin, oil, etc.
Glandular	Bearing glands
Glaucous	Covered with a bloom, a bluish or whitish wax coating
Hypanthium	The cup-shaped structure that bears the sepals, petals, and stamens
Inflorescence	A flower cluster
Pedicel	The stalk of a single flower
Peduncle	The stalk of a flower cluster or of a solitary flower
Petiole	The stalk of a leaf
Pistil	The seed-bearing organ of the flower
Prickle	A sharp, needle-like outgrowth of the epidermis
Pubescent	Hairy
Receptacle	The end of a flower stalk bearing the flower parts
Rugose	Wrinkled, roughened
Sepal	One of the outer cycle of flower parts, usually green, a division of the calyx
Sessile	Without a stalk, seated
Stamen	The part of the flower that bears the pollen
Stigma	The portion of the pistil that receives the pollen
Style	The stalk-like portion of the pistil connecting the stigma and the ovary
Tomentose	Having a dense mat or covering of hairs

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